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SEMINAR SERIES 2024

17 SEPTEMBER

Prof. Megan O'Mara

Senior Group Leader,
Australian Institute for Bioengineering and Nanotechnology, The University of Queensland

Prof Megan O'Mara is a group leader at the University of Queensland's Australian Institute for Bioengineering & Nanotechnology. Her research program aims to understand how membrane lipid biochemistry modulates membrane protein function and impacts cell surface interactions. Her interdisciplinary work spans computational structural biology, membrane biophysics and bio-inspired polymers. Megan completed her PhD in Physical Sciences at the Australian National University in 2005 before moving to the University of Calgary, Canada, as a Canadian Institutes of Health Research Postdoctoral Fellow working on membrane protein structural dynamics. She returned to Australia in 2009 on a UQ Postdoctoral Fellowship. In 2011 she was awarded an ARC DECRA, and moved to the Australian National University in 2015 on an ANU Rita Cornforth Fellowship, and later, Associate Director (Education) at ANU's Research School of Chemistry. She is an Associate Editor for RSC Advances, the President of the Association of Molecular Modellers of Australasia (AMMA) and was previously the Secretary of the Australian Society for Biophysics.

Exploiting protein/lipid interactions for modulators of chronic pain

Modulating membrane protein activity is an important means of influencing biological function: almost 70% of all FDA approved drugs target membrane proteins. Despite the importance of membrane proteins, the impact of specific membrane lipids on membrane protein function is poorly understood and rarely considered in drug development. Understanding how changes in membrane lipid composition in disease states influences drug efficacy is an emerging challenge for the development of personalised medicines, pharmaceutical targeting, and delivery. In this seminar, Megan will highlight her group's recent work using multiscale molecular dynamics simulations to unravel the interplay between membrane lipid composition, protein function, and biologically active molecules as potential therapeutics. She will focus on the development of allosteric modulators of the GlyT2 neurotransmitter transporter from the ascending pain pathway. This work highlights the role of computational techniques in structure-based drug design and the importance of considering physiological membrane lipid distributions when characterising biological function.

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